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A three-year National Project for the Improvement of Televised Instruction was devised to develop a plan for using instructional television (ITV) in education. The project placed major emphasis on learning efficiency and a systems approach and used two sources of continuing information: a National Seminar on Learning and Television and a Field Consultant Service. It was found that ITV was deprecated by educators and educational television broadcasters alike, that the use of ITV was spotty and optional, that emphasis in ITV productions was placed on teaching inputs rather than learning outputs, and that teachers were not aware of the use of educational technology in facilitating educational change. As a result of these findings, an inservice self-instructional course kit and problem-oriented workshops (on the societal, state, and individual urban school district levels) were devised to acquaint educators with the process of systematically analyzing objectives and problems in terms of the learner and to use educational technology to implement comprehensive educational change. In addition, a group of educators visited Samoa to examine the school systems there which operate on the basis of a systems approach and which use educational technology extensively. (SP)

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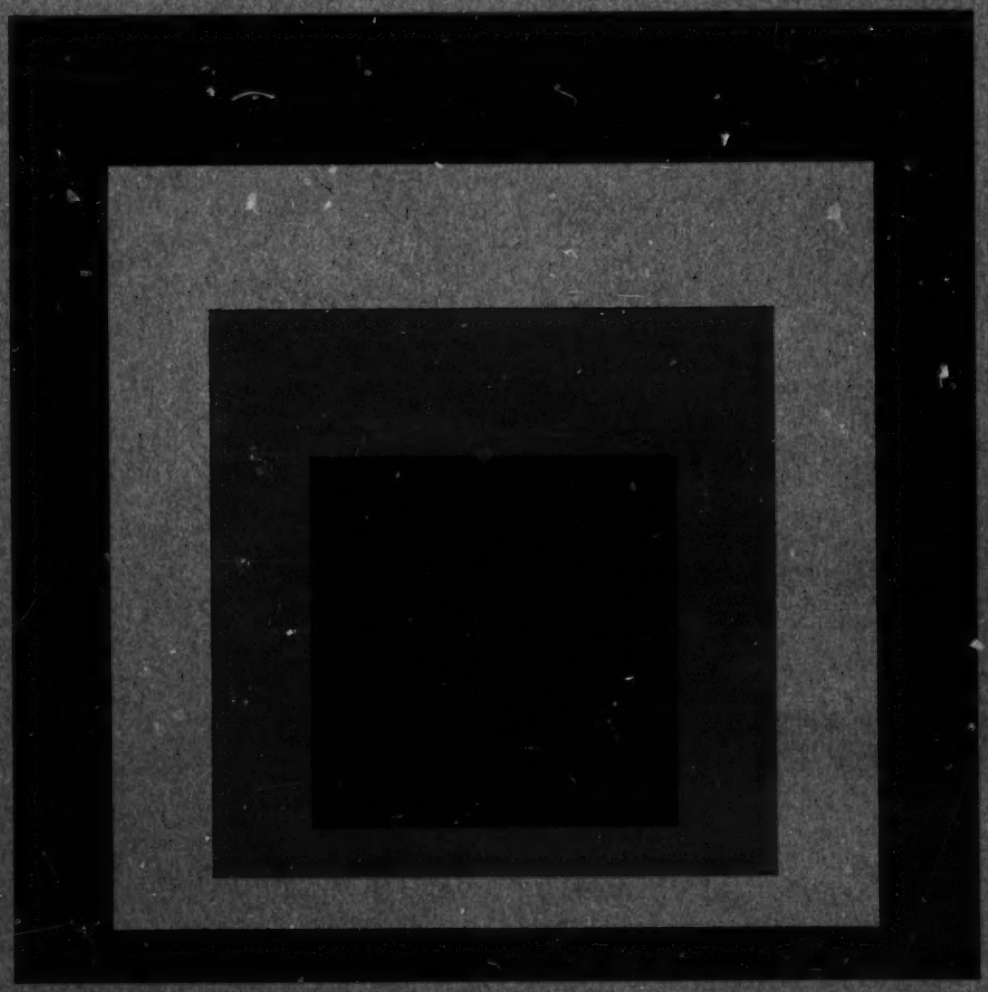
TOWARD A SIGNIFICANT DIFFERENCE: final report of the National Project for the Improvement of Televised Instruction, 1965-1968



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TOWARD A SIGNIFICANT DIFFERENCE: final report of the National Project for the Improvement of Televised Instruction, 1965-1968

NPITI was a project of the National Association of Educational Broadcasters supported by The Ford Foundation.

The activities of the National Project for the Improvement of Televised Instruction listed on the following pages are the results of the efforts of several hundred individuals in American education. To the great many who served as Field Consultants and Special Advisors, the National Association of Educational Broadcasters wishes to express its appreciation.

The NAEB also expresses its gratitude to the Ford Foundation for the support which made this Project possible through the furtherance of the Foundation's continuing and valued interest in the instructional use of television.

William G. Harley
President, NAEB

Foreword

This report is a marked departure from conventional reports on grant-supported educational projects. It is a report on activities conducted by the National Project for the Improvement of Televised Instruction but it adds two significant dimensions to such reporting: *identification and analysis* of the educational problems revealed by the Project's activities, and a *clear perception and prospective* of the strategy which education must use if these problems are to be resolved.

It is refreshing to find a report on the use of television in education which places its major emphasis on teaching and learning rather than on television. One easily recognizes the deep conviction of those most closely involved in the Project that there must be a reversal of past practices; there must be a reversal of the effort to improve education by improving television. To the contrary, it is held that basic improvements in education itself should result in the improved effectiveness of television.

Far from diminishing the role of television in the teaching and learning processes, the report sees the reversal of traditional priorities as the one sure way for enhancement of television's role. As the report states in its concluding section, such enhancement must follow naturally and inevitably from efforts to design broader, more systematic and more comprehensive approaches to the educational task; to redefine our commitments to educational ends rather than to educational means, and to assign a true partnership role to electronic communication and technology.

It is noteworthy that the Project, itself, clearly reveals the developmental character of Project activities. Initial guidelines for action which proved unsuitable for fuller exploitation of Project potentialities were revised or abandoned. In their place, more productive efforts were substituted, activities based on the perceptions already gained by the Project. In this respect, the Project displayed no less conviction in its own efforts at continuing appraisal, analysis and daring than it concludes education as a whole must display. This kind of candor and leadership on the part of those responsible for the Project places the report's conclusions and recommendations on a high level of testimony rather than preachment.

To many readers of this report, it will appear to suffer by reason of its emphasis on analysis and perceptual conclusions rather than a much more neutral objectivity. But to those who may have such a view, careful reference to innumerable studies and research efforts dealing with the use of television in education will be comforting and comfortable.

To those who have become long-tired of "data reports," the keen insights, challenging perceptions and forthright reassessment of educational ends to be sought will be a deep breath of fresh air and fresh hope.

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Introduction

Through a grant from the Ford Foundation, the National Association of Educational Broadcasters operated, for a three-year period from 1965 to 1968, the National Project for the Improvement of Televised Instruction. The purpose of the grant was to develop and implement a program of "systematic and sustained efforts to improve the quality of instruction" through electronic communication technology.

Preliminary expectations were that televised instruction could be improved by upgrading the design, production, presentation and pedagogy of television lessons themselves. The Project activities that were originally planned included consultant services, workshops and seminars for personnel involved in instructional television. However, early discussion with the Project's advisors and a subsequent seminar revealed that this analysis was only partially valid. The improvement of a medium, or means, could not be dealt with as an end in itself. It had to be part of the general movement toward the improvement of instruction, which, in turn, was part of a concern for orienting instruction to the needs of the individual learner. This concept, while frequently stated, is infrequently applied. The Project nevertheless accepted this as a critical objective. The activities that are reported in the pages that follow are a part of the developmental process which was directed toward that goal.

directions

The Project's initial task was not to present solutions, but rather to clarify problems which would, in turn, indicate the direction toward new solutions.

The early months were spent in meetings with a variety of educational organizations and advisors. [1/] There was a general concensus that the Project should place major emphasis on learning efficiency. Activities would be aimed initially at elementary and secondary education with specific concern for:

- Decision-makers in administration and curriculum;
- Practitioners in teaching;
- Faculties of State Departments of Education and Teachers' Colleges.

Because of the financial and time limitations on the Project, there was some feeling that it should concentrate on programs which would yield maximum long-range improvements in televised instruction.

With the basic direction established, the Project sought next the continuing supply of information with which to operate. Two activities were undertaken: a *National Seminar on Learning and Television* to survey the problems in depth and a *Field Consultant Service* which provided continuous information about educational concerns and served to validate Project approaches in actual situations.

1/ An Ad Hoc Advisory Committee met with the staff in October, 1965 and a permanent National Advisory Committee was named. The group met in December, 1965, and April, 1966.

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A. NATIONAL SEMINAR ON LEARNING AND TELEVISION

At a three-week meeting at Stanford University in July, 1966, learning theorists, educational psychologists, educators and educational communicators probed the problems of learning and of the existing school environment. The Seminar particularly sought areas where the use of communication technology might be relevant.

In retrospect, three generalizations resulting from the efforts of the Seminar had a major effect on Project thinking and subsequent actions:

- Although the *process* of education is individual-learner oriented, the *institution* of education has become teacher-administrator oriented;
- The inability to do much about this disparity between *process* and *institution* is due chiefly to logistic problems in educational management. There are chronic lacks of time, space, trained personnel or appropriate materials, and a corresponding lack of information to encourage the best use of present logistic resources;
- Television, in addition to its known psychological characteristics, has certain logistical characteristics that make it potentially one of the more valuable instruments for educational management. The ability of electronic communication to *move experiences to people* permits the accomplishment of objectives without incurring the financial and/or time "costs" for *moving people to experiences.*

B. FIELD CONSULTANT SERVICE

During the early months, the Project's Field Consultant Service undertook several major consultancies for schools and colleges whose familiarity with instructional television ranked from "experienced pioneer" to "about-to-begin." A complete list of consultant visits appears on page 42.

It soon became apparent that most institutions requesting assistance saw television as a "problem" that stood apart from their other concerns in instruction, administration or curriculum. A concept that viewed technology as a means for *dealing* with problems was lacking.

While instructional television had grown rapidly, and in many areas was a large-scale educational activity, there was a lack of a clear understanding as to the place and varying functions of television and other technologies in the overall improvement of instruction. In many cases, the development of instructional television appeared to be the result of happenstance, individual enthusiasms, or their lack, current trends or local pressures rather than the result of real understanding of the relationship of this tool to immediate and long-range educational objectives.

This lack of perspective appeared to be the underlying reason for the lack of genuine commitment by instructional and curriculum leadership to use fully this tool to effect dramatic changes in teaching or learning. Many curriculum personnel were aware of television offerings in their field of specialization but few of them were actively using the medium to accomplish their major aims. Consequently, instructional leaders gave only passive support to instructional television. Teachers, in turn, tended to ignore its value.

In most institutions, such deficiencies in understanding and leadership commitments resulted in "policy" that television was to be only a supplementary learning resource for those classroom teachers who voluntarily chose to use it.

This optional use led to spotty television receiver distribution. Some schools had one or two sets. Others had many. The number of sets often seemed to depend on such factors as the availability of federal funds, possession of local school funds or the affluence of the parent-teacher association rather than upon a policy of insuring coverage for all appropriate learners.

Early consultant visits also provided an interesting glimpse at the production problems of instructional television. For several reasons, ITV specialists seemed to have acquired a feeling of "second class citizenship" in the education profession. Because they were working within the confines of what the instructional practitioners "thought" television could be used for, ITV specialists were restrained from active participation in the central process of education. Moreover, the ITV producer-director, utilization administrator and, many times, the television teacher, were seen by the ETV broadcaster as being somewhat less than a "broadcaster," and by the educator as being somewhat less than an "educator." This was further compounded, in some cases, by a feeling of inadequacy due to lack of experience either in the techniques of teaching and learning, or in the techniques of communication.

Interestingly, though, these feelings and attitudes did not necessarily result in poor ITV production. Quite the contrary, for, denied a meaningful role in the educational process, the instructional television specialist had to seek his satisfaction in pursuing the evasive concept of "quality production." The idea that "good" ITV was primarily slick, well-budgeted ITV raised few eyebrows in conventional educational systems for it mirrored and magnified the prevailing classroom concept that a lesson could be "well-taught" without knowledge as to whether anyone learned what was intended.

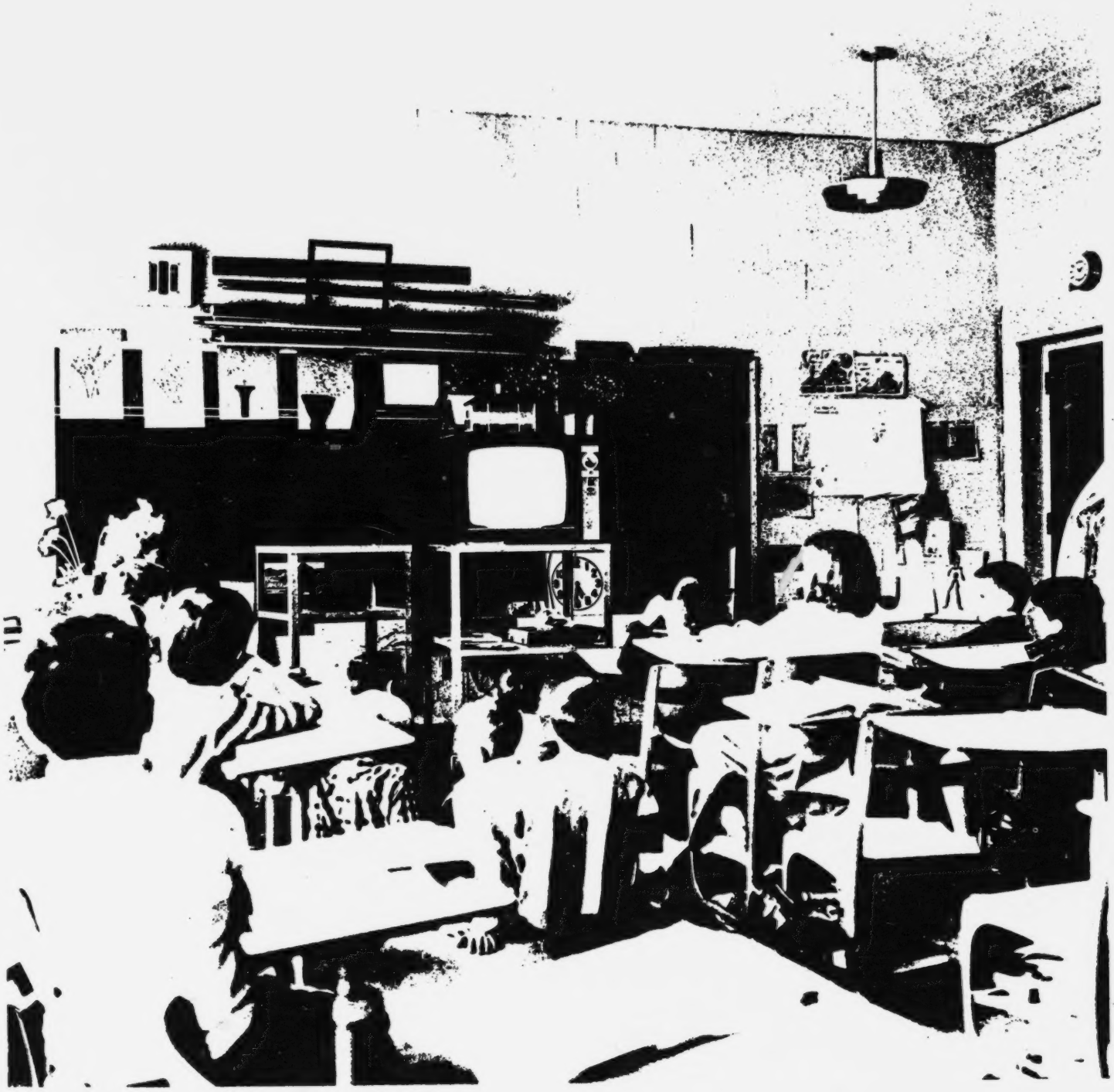
Information from Project advisors, from the National Seminar and from visits to schools and colleges provided by the end of the first year a conceptual framework which indicated the primary direction for the remaining two years. The subsequent activities of the Project would proceed from two conclusions regarding television's relationship to the learner:

- Deficiencies in instructional television programming stemmed from poor understanding of learner performance. There was an overconcentration on what went into lessons without adequate concern for the responses it evoked;
- The deficiency in the classroom use of television was failure to deal with the fact that the student response also depended upon stimuli beyond the organized presentation. The classroom itself had to permit the proper interaction of material and human resources with the student.

All that the Project subsequently undertook related to one or both of these conclusions. Additionally, the Field Consultant Service was continued to assist ongoing ITV operations, while also serving the broader purposes of providing new information to help shape Project directions and providing the opportunity to apply the concepts being developed by the Project.

Activities

The Project considered it more useful to identify and work with the capabilities that electronic media offer education than to search for ways these tools could simply be "fitted into" current educational practice.



A. THE MEDIUM . . . AND THE POSSIBLE MESSAGE

The Project proposal called for the development of effective "in-service training programs for those who constitute the staff and faculities that plan, operate, prepare and utilize instructional television." These programs were to meet the problem of ITV personnel "who . . . have not generally accepted the fact that television is a part of education and not a part of show business." Continuing efforts, the proposal stated, "must be made to develop educational communication personnel who have a fundamental appreciation of the basic human processes that are involved in education." The observations of the first year supported the conclusion that the improvement of ITV programming would have to rely upon improved skills of ITV practitioners.

1. *The Self-Instructional Course "Package"*

Most producers, directors, graphists and television teachers had been trained to manipulate television as a mass communication device primarily suited to passing along information. They often lacked a basic understanding of how an individual perceives and learns. Moreover they had little knowledge of the newer concepts of organizing and sequencing instructional presentations for effective individual learning. They tended to treat the medium as a mirroring non-interactive surrogate of the classroom teacher in his old familiar role as a talking dispenser of information.

For television to fulfill a truly valuable mission in education, its practitioners had to be trained to handle the medium as an integrated part of larger, objectively designed systems. Unfortunately, such training was generally neither available to persons working in the field nor to those who would enter the profession in the years to come. It was clear that if instruction by television were to be a basic facilitator of the developing science of instructional design, then effective techniques for in-service and pre-service education would have to be developed.

The casual sharing-of-experience called the "workshop" was not adequate. Previous experience with the operation of conventional television workshops had indicated that:

- The technical facilities required were relatively expensive for the number of individuals who could utilize them;
- The principal benefit was most often information exchange, but this could be achieved just as effectively at other types of meetings;
- The staff members who most needed help were seldom those whom an institution would send to these meetings;
- Workshop seminar curricula seldom employed learner-based teaching techniques or media.

A group of distinguished educational, research and media figures were brought together to consider alternatives to the conventional ineffective workshop. This group recommended the development of a corrective in-service training course which was designed to be "self-instructional." The "self" was defined as the minimum group required to design instruction for television. This usually would include a teacher-presenter, a producer-director and a graphic specialist. The instructional materials in this course package would be utilized in the home production environment of its users on equipment with which they were familiar.

The advisory group determined a number of performance objectives for the training course project. These basic requirements were assigned an instructional design firm for development. Under the supervision of Project advisors, the firm provided preliminary design elements for the in-service training course. This material was evaluated by a second group of educators, researchers and media specialists. Certain suggestions for changes in emphasis and tactics were made and it was the concensus of the advisory group that the preliminary design was of such quality that the development and production of the materials should be completed.

Through contact with the U. S. Office of Education, the NAEB learned that the Bureau of Research was preparing to fund a related proposal for development of a "programmed course for group instruction of secondary teachers and administrators in the techniques of instructional technology." Consequently, the NAEB prepared a proposal to fund production of the design in a manner that would provide a special sequence as a component of the broader program. The combined program would then substantially meet the Project's initial objective, comprehending the scope and level of content necessary to train teachers, administrators and ITV practitioners in the "principles and specific techniques of instructional technology, instructional systems, and their application to the design of instructional materials for television." 2/

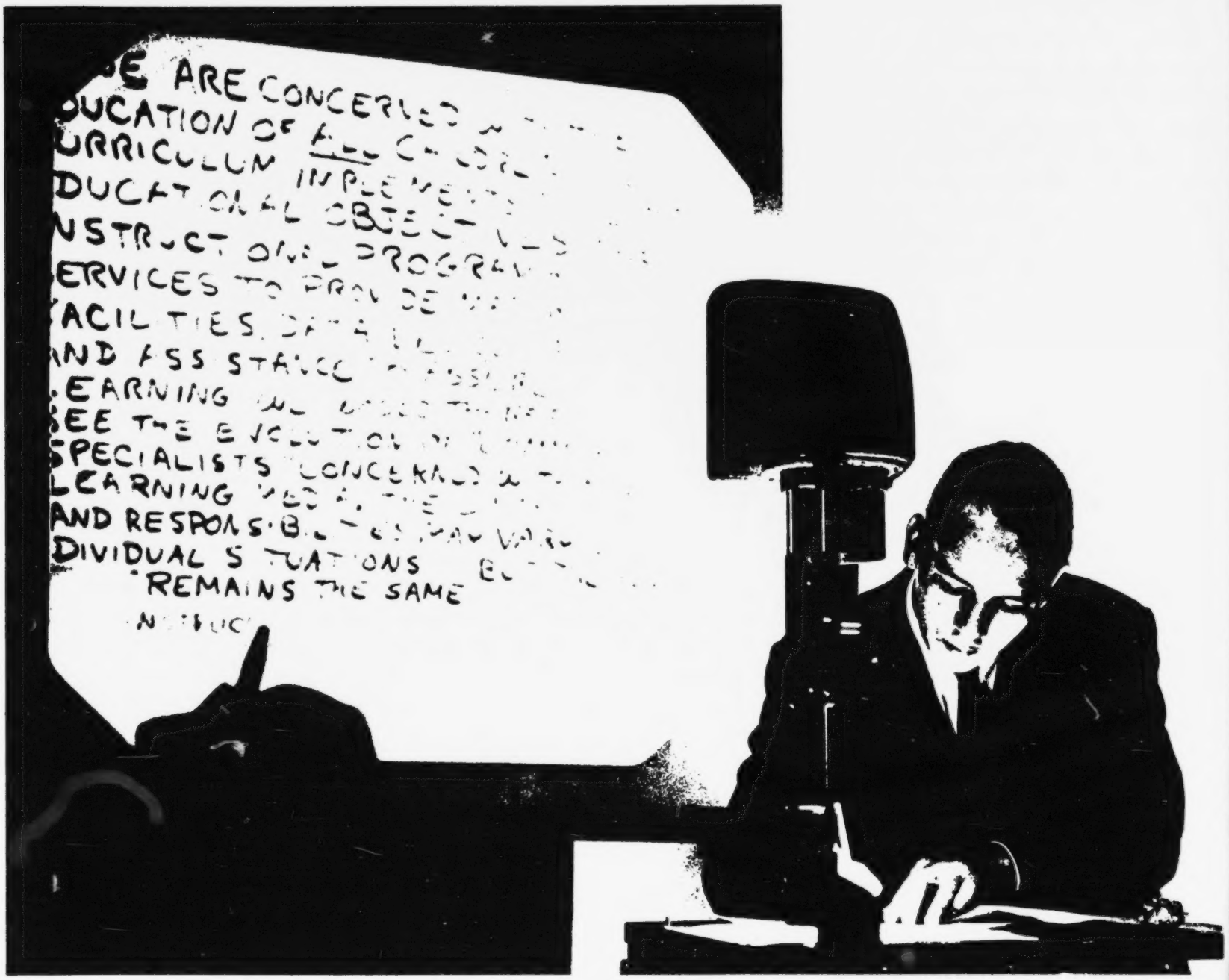
When the materials are developed and become available, their application could have an extremely significant effect upon the development of television as means of facilitating more efficient and systematic learning.

2/ The proposal, which sought funds to develop, validate, produce and apply this course module, was submitted to the Office of Education and was approved. However, subsequent limitations on the Office of Education's appropriations for new projects have delayed the funding of this specific activity.

2. *The Dade County Example*

The potential value of these training materials was demonstrated in June, 1967, when the Project conducted an in-service workshop for the instructional media and curriculum staff of the Dade County, Florida, Public Schools. Project specialists in psychology, learning theory, programmed instruction and television production led a group of some 35 instructional leaders through a 45-hour course which roughly paralleled the proposed NAEB "package." Immediate results were encouraging, concerning the kinds of professional behavior changes which might occur in response to such training. Additional assurance of the benefits of this training came the following year when the Dade County staff began the production of a new and programmed mathematics course, *It Figures,* for the accelerated sixth grader. As described in an educational journal:

> "What makes the program unique is that every single lesson package is being validated - - tested and then revised with experimental groups as many as four times, if necessary. *It Figures* is a proven success when finally introduced to classes. The program is the work of the supervisor of elementary mathematics, a studio-teacher, a researcher-validator, and a television producer-director. A writing team works closely with them to prepare the student exercises that are used for two days following each television lesson . . . . The final result is a television series with a proven effectiveness which allows students to work almost independently while learning advanced mathematical concepts. . . .
>
> "All the lessons incorporate pre-determined goals and objectives that are to be achieved in one television and two follow-up class lessons with the student materials. For purposes of validation, experimental classes are pre-tested, then presented the total package by their teacher who has been appropriately directed.
>
> "After the alloted time for the telecast and the student materials, the class is retested with a form equivalent to the pre-test. The package is considered to be valid if pre-test criteria have been reached as shown by performance on the post-test. If those criteria are not met the team again rolls up its sleeves and analyzes responses to determine the weakest section of the package. When it has been redone, the validation process is repeated with other selected classes until the criteria are met. Sometimes it means four revisions; other times the package might have to be almost totally scrapped because too much was attempted at one time. . . .
>
> " 'It took,' said Dade County's supervisor of instructional television production, 'a lot of learning on our part. But we are all convinced that this approach to television lesson production is the one that provides the best means of developing television lessons, not only in mathematics, but in every area of curriculum.' "



A related outcome of the workshop conducted by the Project might, in the long run, be of greatest significance. In traditional practice, teaching personnel, especially those who specialize in content areas, are moved out of the classroom into supervisory or central staff positions as they increase in expertise. Thus, they are denied the basic reward of education - - seeing their effect on a learner. In Dade County, a new spirit and enthusiasm became evident in the cooperative development of validated lessons designed to learner performance objectives. Because of the repeated pre-testing on students' samples, the staff knew *before* the lessons were transmitted that they would serve as *an efficient stimulant to classroom learning.*

B. THE MEDIUM . . . AND THE ENVIRONMENT

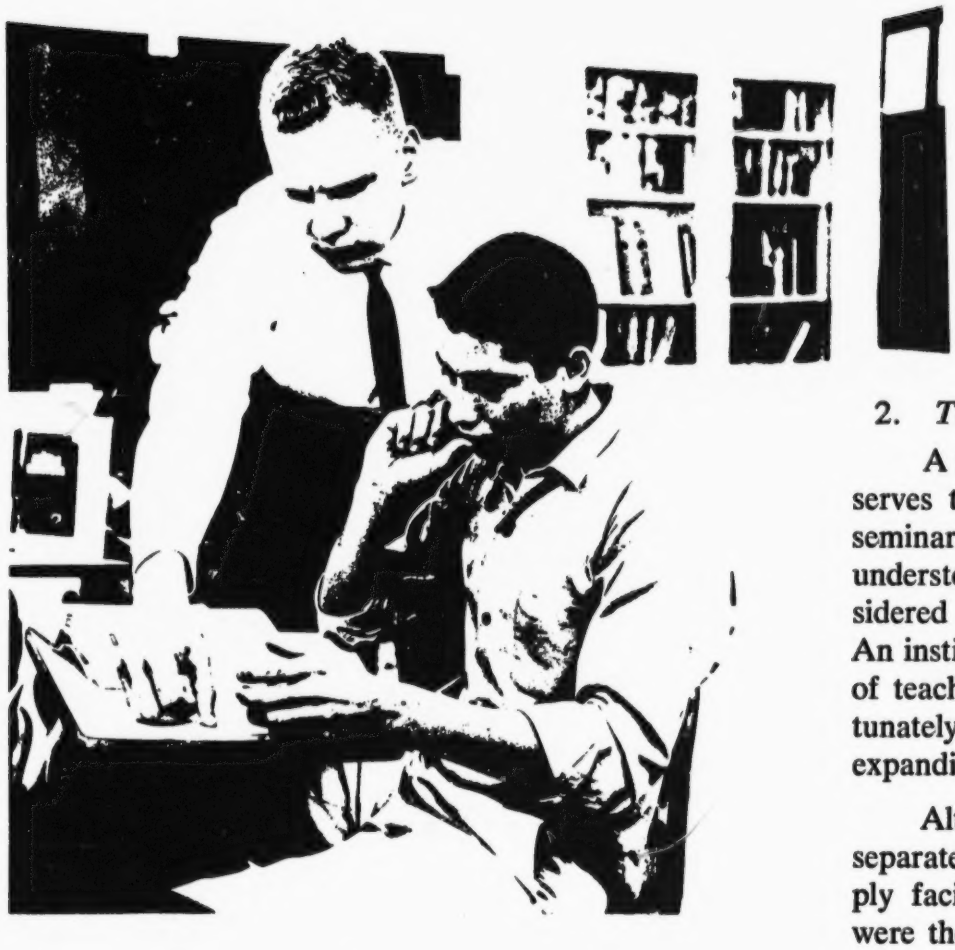
1. *Logistics*

The July, 1966, Seminar provided opportunities to look at the issues from several points-of-view. One such exercise led to an exploration of educational problems that were principally those of moving the sight and/or sound aspects of an experience.

It is no surprise that the list of such problems was a significant one. They were not limited to instruction alone, but included administrative and supervisory concerns. They encompassed the basic problems of effective educational management, the movement of appropriate experiences from a limited number of places to a large number of places, and the corresponding collection of information, or feedback, from many places back to a few. Included were:

- Problems of providing access to limited human or material resources on an equal basis. This is central to equalizing educational opportunity for the geographically and economically deprived, and to any concern for individual instruction;
- Problems of moving relevant and timely information for planning purposes. This is a basic consideration when trying to provide for the continuous updating of knowledge and methodology in an age of change, in providing diagnostic information regarding students, in providing curriculum feedback regarding learning objectives attained, in providing for effective records collection and in the provision of opportunities for greater staff and parental involvement in planning;
- Problems of depersonalization resulting from a lack of time and/or space for meeting among the various working components of the institution;
- Problems of bringing students into understanding contact with experiences, capturing reality without adult interpretation for study on a more frequent basis than the "field trip" provides, capturing individual behavior for self-analysis and preserving non-replicable incidents.

While many of the critical problems facing education seem to pivot about an inability to move information or experiences, the prevailing definitions of "communication" have been limited to rather simple tasks of content organization or message display. Consequently, much early research effort had been devoted to effectiveness studies of information organization and presentation on television compared with information presentation through other media. The more difficult use of television as a device to deal with the many logistic limitations in the basic organization and management of the educational environment had been virtually neglected.



The Fund for the Advancement of Education's major demonstration of instructional television during the late 1950's - - The National Program in the Use of Television in the Public Schools - - might be considered an exception. Schools participating in this project had to make a commitment to use television as an "integral part of the regular instructional program." Such major use, however, required changes in the management of the logistic elements of the school environment. The "constants" such as group size, bell schedules and room design had to be altered. By treating these factors as variables which could be rearranged to use resources more efficiently, significant insights were gained that were by-products of the original research design. Many of these same schools continued from that point into team teaching, modular scheduling, variable grouping arrangements and functional school design.

2. *Toward Learning*

A re-interpretation of past procedures and research serves to reinforce the idea generated by the Project seminar: that the educational environment can best be understood, and effectively managed, when it is considered and structured about the needs of the *learner*. An institution today that is structured around the needs of teaching is neither appropriate, adequate, nor, fortunately, all that is possible for us to do, in dealing with expanding and growing educational problems.

Although we know that teaching and learning are separate though related processes, we continue to apply facilitating resources as if teaching and learning were the same. The recent Office of Education study on the *Equality of Educational Opportunity,* observes that it is our teaching in-puts rather than the learning out-puts that have become the measure of our schools. The school with more books, better paid teachers and newer buildings is assumed to be a "better" school regardless of the measure of learning that takes place within it.

These perceptions of education are not easily changed. Most Americans have known no other educational system but the familiar one in which the student is placed physically "in opposition" to the teacher, and for twelve or more years sees time, space and materials structured around the needs of teaching. But differentiating between the two processes - - teaching and learning - - is a basic requirement as we begin to develop comprehensive systems of education. We must force ourselves to view educational problems and solutions primarily from the point of view of their effect on the learner rather than on the teacher and administrator; otherwise there can be no guarantee that the additional monies, the new practices, the personnel and the technologies will do little more than facilitate a prettier or smoother running environment, but with no measurable improvement in learning.

This basic re-orientation of educational purpose is requisite to any new understanding of communication technology's role. To this end the Project directed its effort toward the development of communication instruments to help educators attain this required perspective.

3. *Bridges to the Possible*

A man's expectations are usually limited to what he believes can be done. It is difficult for the practitioner in any field, occupied with daily operational concerns, to recognize that some of the "unattainable" goals about which he may have speculated are actually within reach. This is especially true if the new perspective requires an adequate understanding of an unfamiliar technology. The fact that, today, electronic media can help to bring educational "ideals" into operation is of little value if those who prescribe the objectives for education are limited by the old, restrictive expectations.

Two elements seem vital to the development of an administrative perspective that would bridge the gap between what we do and what it is possible to do: one, a sense that it actually is possible to accomplish more than we are now, and two, a systematic way to do it. The Project chose to explore the first element through a seminar that would provide an opportunity for a group of America's top school administrators to see, in operation, a system of education that effectively employed many of the principles of change that had reached only the discussion stage in their own school systems. The Project decided to investigate the second element through a series of problem-oriented workshops which would develop systematic processes for applying communication technology to educational problems.

a. The Example in American Samoa

The school system of American Samoa provided one of the few locations where comprehensive educational change facilitated by communication technology could be observed. Knowledgeable educators who had visited the islands had often indicated that the development in Samoa had particular relevance to the urgent problems facing American education. Consequently, with organizational and financial support from the Project, former Governor H. Rex Lee, and William Harley, president of the National Association of Educational Broadcasters, issued invitations to a small number of U. S. educators,[3/] chosen for their leadership ability and positions in areas of critical educational need, to visit Samoa to "study the relevance of certain aspects of the educational development in Samoa to the critical problems in American education."

[3/] School administrators who participated in the study trip and their position at the time, were: Robert E. Jenkins, Superintendent-elect, San Francisco; Dr. Mark Shedd, Superintendent-elect, Philadelphia, Pa.; Dr. John A. Sessions, Board of Education, District of Columbia, Washington, D.C.; Dr. Samuel Shepherd, Jr., Assistant Superintendent of Schools, St. Louis, Missouri; Herman Goldberg, Superintendent, City School District, Rochester, New York; Dr. John B. Davis, Jr., Superintendent of Schools, Minneapolis, Minn.; Dr. Carl L. Marburger, Assistant Commissioner of Education, Bureau of Indian Affairs, Washington, D.C., and State Commissioner of Education-elect, New Jersey; Dr. Lee Wickline, U.S. Office of Education; and Dr. Ralph McAllister, Director, Carolinas-Virginia Regional Educational Laboratory.

At a briefing in San Francisco on May 20, 1967, the listing of original educational problems had a ring of familiarity to the mainland educators:

- A lack of clearly established goals for the schools had resulted in a poorly defined curriculum;
- There was a failure to teach fundamental skills;
- The methods of instruction emphasized memorization with little attention to understanding;
- Overcrowding of the school buildings was the rule rather than the exception;
- Textbooks and other materials, if available, were out-of-date and had little or no relevance to the experience or needs of the students;
- An ineffective teacher preparation and in-service training program resulted in poorly educated and prepared teachers;
- Students came to school with an oral language that was inadequate for use as a base for further study.

What was seen or experienced in Samoa during the subsequent eight days can best be summarized by a statement, released to the press upon the group's return to Honolulu on May 29, 1967. "A dramatically new system of education in American Samoa - -a system that employs televised teaching as an integral part of the day-to-day instructional process - - shows great promise of helping to overcome severe learning deficiencies of the Samoan people," the statement noted. "The most important implication of this system for schools on the mainland is that *sweeping changes are being made throughout the entire system of education* - - changes brought about by a comprehensive reassessment of the goals and the content of the curriculum, the use of professional and of technical personnel, the methods of instruction, the school facilities and the functional role of modern technology in implementing the basic system-wide changes required."

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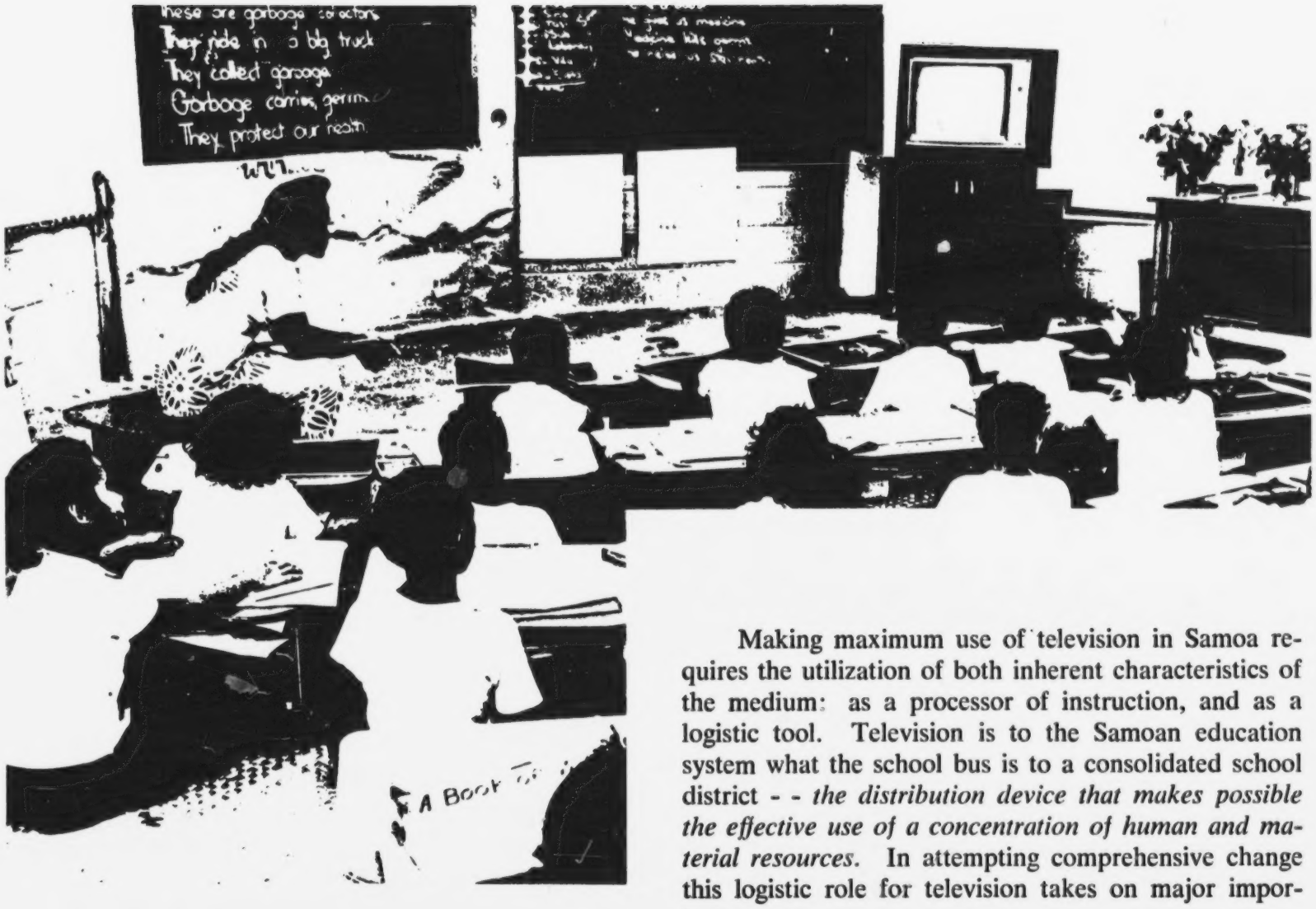
The educational system in American Samoa is the *system of the possible,* Marjorie McKinney, assistant director of education for secondary instruction, pointed out early in the visit. "It is the system that is possible at this time, May 1967, with the buildings, facilities, leadership guidance, and staff now available. It is not what it will be in 1976 when the first class taught in television schools completes the 12th grade."

This concept of a developmental system and curriculum in which the only "constants" are objectives that are at the minimum eight years away is basic to an understanding of this system. It becomes apparent that the educator's most creative task today can be to place in workable combinations the changing material and human resources of learning as he proceeds towards his goals.

The visitors to Samoa themselves noted that the system allowed "a continual adjustment of the instruction in response to the learners' evolving needs."

The daily operating philosophy of the system was expressed by the Supervisor of Elementary Schools Gene Sweezey. "The essential underlying factors . . . are that the person for whom the system is designed must have a part in its development and operation; and that we must respect him for what he is and use what he is in the educational design."

The seeming paradox of a centralized curriculum that can still be "continually adjusted in response to the evolving needs of the students," the visiting educators noted, was primarily feasible because of the principal elements in the process which the Samoan educators refer to as "cooperative instruction." This is a process which makes available the total resources of a system to the team of people that supports the learner and the classroom teacher. One could sense from discussion with operating personnel that all who affect the design and delivery of instruction are aware of their responsibility to the learner and their vital role as a link, no matter how small, in making learning possible. This perspective permits the team member, whether he be television instructor, research teacher, producer- director or graphic artist, to relate constantly to the objectives. It further makes possible the development of television presentational techniques that are validated on learners rather than by the advice of professionals.


These are garbage collectors
They ride in a big truck
They collect garbage
Garbage carries germs
They protect our health

Making maximum use of television in Samoa requires the utilization of both inherent characteristics of the medium: as a processor of instruction, and as a logistic tool. Television is to the Samoan education system what the school bus is to a consolidated school district - - *the distribution device that makes possible the effective use of a concentration of human and material resources.* In attempting comprehensive change this logistic role for television takes on major importance.

The importance of instructional materials that are not "hard bound" to a system that is in dynamic change was noted by the mainland educators. Electronic distribution of core curriculum presentations, accompanied by low cost print reproduction of locally produced materials (approximately one million pages per month), makes it possible to change the materials according to feed-back from the learner. "Tomorrow's presentation must be based upon what was *learned* today, not upon what was *presented* today," is one of the basic tenets laid down by Vernon Bronson, the principal educational designer of the Samoan system. Whenever there is objective evidence that the pupils did not learn what was intended, the "teaching team" composed of television teacher, research teacher and producer-director must structure a more effective presentation of the lesson. "There is one test continually applied to the teaching-learning process," former Samoa Director of Education John Harold has written, "did the child learn what was intended?"

In its third year of operation, at the time of the visit, the administration for American Samoa acknowledged that "*the system will not work because of any inherent value; it must be made to work by those who see its validity, understand its demands and perceive its potential.*" Our challenge, the administrators stated, "is for each to perform with excellence the task that is uniquely his - - with the realization on the part of each individual that successful performance on his part is crucial to the effectiveness of the whole system." This, they pointed out, is easily stated but difficult to implement. "We have difficulty in convincing new employees, quickly, that they are engaged in an activity that makes specific demands upon their talents."

"Too often," claimed Roy Cobb, the director of education, "we think of 'imagination' and 'creativity' in terms of 'what I want to do' or in terms of 'what I think is best.' This attitude cannot survive here."

The organization of the schools in Samoa is designed to accommodate both educational "systems" - - the students' and the teachers'. The elementary principal's first responsibility is for the effective learning of the students, but he also performs the vital job of working with the indigenous teacher, demonstrating methods and building confidence. He is the "principal teacher" in the classroom most of the 7:30 a.m. to 1:30 p.m. school day, and is frequently operating local in-service courses that are provided via television in the afternoon. "If you are to be effective as a supervisor," one administrator suggested, "the teacher must be happy to see you when you come into the room." This appears to be true in Samoa where teachers and principals see themselves "on the same side," working *for* the student.

Complementing the job that the principal does is the concurrent system of in-service education with printed materials for each course, highly structured summer workshops, television presentations regarding specific problems and finally, as noted by the visiting educators, the classroom teachers' "constant re-examination of their own techniques in relation to those of the television teacher - - thus learning through observation rather than by more indirect means."

While some may consider it a limitation that the Samoan system at present relies principally upon one major form of technology - - televsion - - it is a form which embraces many others. Moreover the system does make understandable technology's more appropriate role and relationship in education. Educators and technologists argue over whether they will ever be able to be able to teach human values, sensitivity, social awareness and moral responsibility by machine. Yet it is technology, properly planned, which enables human beings to operate more efficiently and effectively. The challenge that was before the designers of the Samoan system, and before the rest of education today, is to use the technologies and organizational patterns available to them to make this possible.

What was found pertinent and translatable in Samoa was the process: a process that starts, in the words of Vernon Bronson, "with total consideration of the problems of providing learning opportunities; that enables the educator to modify his techniques and methods in order to insure attainment of stated goals; that views technology as a means, rather than an end in itself, and that permits integrated, developmental planning and practice."

Samoa proved to be a comprehensive example of what it is possible to do now if one *systematically analyzes his basic objectives and problems,* and views *technology as an implementing device.* This technology permits not only the transmission of instructional materials, but, more significantly, the optimizing of scarce talent and resources; the development of new, comprehensive approaches to the management of the school environment, and a total, multi-dimensional approach to the complex social, economic and geographic problems that affect the learning-teaching process called education.

b. Problem-Oriented Workshops

Using the insights gained in Samoa as a base, the Project next had to face the problem of developing effective means to communicate the system of the possible to other educators with similar decision-making responsibilities.

To explore the concept of television as a means to facilitate educational change, a series of problem-oriented workshop-conferences was initiated. Three were conducted before the Project concluded in the Fall of 1968. The meetings were developmentally structured, with the results from each feeding into the planning for the following meeting. The meetings themselves dealt with educational problems on three completely different levels: societal, statewide and individual urban school district.

The first meeting, *Communication Technology and the People Left Behind,* sought new approaches for dealing with the problems of rural poverty. Attendance at this meeting was a mix of persons dealing with various rural problems, but without any specific background in technology and persons working with communication technology but not necessarily having any background in rural concerns.

The second workshop dealt with educational problems on a state level. It was a leadership seminar conducted for the State of Hawaii to provide a better understanding of the relationship of its state ETV network to educational and governmental problems in the state. Participation was limited to government and education leaders, including the legislative Education Committees, State Department of Education personnel, the State Board of Education and The University Regents.

The third conference, conducted for the administrative and instructional leadership of the Milwaukee Public Schools, served to identify new, cooperative approaches to urban school management.

The basic approach in each of the meetings was similar. Instead of concentrating on technology as the problem, the agenda focused on the broader problems with which technology could deal. The participants in each case were initially challenged as to the appropriateness of the "conventional" view of education.

The basic work of the meetings involved the participants in a systematic analysis of their own problems - - defining them, assessing available resources, determining what had to be done and what resources would be required to do it. Finally, strategies were developed with communication technology as a facilitating tool to help accomplish these new objectives.

The effect of these meetings on the behavior of administrators could not be fully evaluated due to the brief time between their occurrence and the Project's conclusion. Tentative results indicate that developing this new perspective is not only possible, but as the Project learned, it can be a creative exercise for the practicing educator.

The first step in all cases was the re-definition of problems in terms of their effect on the learner. For instance, a recent survey of school staff in our large cities revealed that the following conditions are considered their most serious problems:

- Unrealistic and inadequate curriculum;
- Poor pre-service and in-service education of teachers;
- Environmental realities that tax the capacity, functions and resources of the schools;
- Excessive teacher load;
- Poor communication among teachers, administrators, parents, children and community;
- Ineffectual administrative practices;
- Insufficient or unpredictable financial support;
- Inadequate facilities.

These problems can be easily re-stated from the point of view of the learner. That is, a child *lacks access* to material resources that relate to the world in which he lives, and to individuals who have the time, skills, or perhaps even the interest to care about and understand him. The inaccessibility of human and material resources is a problem that actually exists for both the learner and the teacher. The professional staff does not have the time or resources which permit it to design appropriate instructional materials for these learners who lack access to materials that relate to the world in which they live. Nor does the staff have access to effective continuing educational opportunities for itself.

This accessibility gap can be looked upon as a logistic problem which involves the movement of people, or of things, through space and/or time to affect the learner. Additionally, the problems of large scale, cooperative efforts are derived from the same logistic base. We can work with those with whom we have easy access if they are not too distant; if it costs too much, in time, to get together, then we cannot cooperate efficiently.

Education is still operating on the basis of providing access through physical movement alone. While the rest of society has begun to substitute the electronic highway for the concrete one, and let its "fingers do the walking," education persists in re-inventing new ways to use the concrete path.

Many of the so-called innovative "projects" in education today are designed to put human and material resources "on the road" with the hope of facilitating learning. One state planned to put teams of master teachers on tour as models of good teaching for staff members in outlying schools. Similarly, in another state, a symphony orchestra was divided into small groups and sent out, on wheels, to visit elementary schools in the region. In each of these cases, the result for the learner was less than successful. Had the concern been for the effect on the learner rather than for the experience itself, it would have been realized that more structured, more frequent "contact" was required to achieve desired changes in the learner's behavior.

The Project's workshop experiences demonstrated that when educational planning starts with its chief concern being the effect on the learner, new roles can be perceived for electronic communication technology. The experience might be moved to the learner in ways which would permit more frequent access to the experience. Following are some approaches, based on insights that were considered possible by workshop participants:

PROBLEM: *The need for updating the understandings and the skills of administrative and teaching staffs.* Although we know that behavioral change should be rewarded rather than punished, we still make professional personnel travel on their own time to take advantage of in-service opportunities after school, on weekends or during the summer. When models of good methods are identified we physically move teachers to this model, or the model to the teachers, by wheel.

POSSIBLE APPROACHES: Properly designed in-service resources utilizing the most appropriate authorities can be brought to the school, electronically, for use on "company-time" as part of the staffs' professional responsibility. Examples of "real" situations can be captured, librariied and similarly made available as needed. In addition, one of the most valuable techniques for facilitating the development of skills - - self analysis of one's behavior - - is now increasingly possible because of the low-cost video tape recorder.

PROBLEM: *Teachers performing inappropriate roles.* Teachers spend eighty to ninety percent of their time transmitting information, verbally, to groups of students. This is done in spite of the fact that all teachers are not necessarily interesting and inspiring speakers and in spite of the fact that students learn more by doing than listening.

The apparent limits of available time, materials and space seem to force the teacher to "cover the subject" rather than to guide individuals in their own "uncovering."

POSSIBLE APPROACHES: The traditional solutions to this time problem involve reduction of class size by "buying" more teachers; reduction in non-presentational duties through the "purchase" of teacher-aides or by attempts to provide more time for education through longer school days and years. Too frequently, the time gained for the classroom teacher to spend on appropriate learning activities is simply used for additional presentations or lectures.

It is necessary to consider "trading-off" much of the classroom teacher's presentation role to those with special communication skills who are given the time and resources to organize and present material effectively. Since the time invested in well-organized presentations permits more information to be presented in less time, the classroom time that is "saved" can be reinvested in the more vital learning activities that require teacher-student contact. The learning efficiency made possible by this more effective use of time is not limited to one classroom, because electronic communication extends the presenting teacher to a large number of classrooms, and the basic trade-off can be extended.

Electronic communication makes it possible to take advantage of the skills of a larger number of professionals who are usually separated by time or space from classroom learning activities. By storing on tape (or in a computer) the end product of cooperative design and production, the material can be tested on students and modified if required.

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PROBLEM: *Inappropriate, inadequate and inaccessible curriculum materials.* A student coming to school today can, and usually does, know much that is happening in the next town, the next state or on the other side of the world. This rapid flow of information makes possible instant reactions to events that may be physically many miles away. Within this free flowing world of information, the school, an institution which had originally been set up to facilitate the movement of ideas, stands rigid and hard-walled, unable to accommodate or react to the real world around it. It not only has difficulty in reacting to outside events, but it has even greater trouble in reacting to internal demands such as those posed by the development of new curricula.

At the present time, our curriculum direction comes, for economic reasons, from "hard-bound" materials. These permit repeated usage, and because of mass distribution techniques, make it possible to bring certain agreed-upon collection of information to the greatest number of students. To maintain the logistic economies of commercially-produced and disseminated materials, they must usually be designed for use by very large audiences. Since they reflect major investments by commercial producers, they are expensive to revise and must be used for a number of years in order to pay back the original investment. The contents of these materials, if not actually outdated by the publication time, are likely to be more than stale by the time the slow administrative processes of selection, procurement and dissemination intervene.

Materials can be created today that are drawn from the day-to-day real world and are designed within the frame of reference of the children who will use them. The basic problem, however, is being able to make these materials readily available to learners in a low-cost format which permits prompt updating and widespread dissemination.

POSSIBLE APPROACHES: One cannot consider the economics of instructional resources today without being concerned with the cost of producing desired learning outcomes with the least time-space-resource input.

One must question whether "hard-bound" materials are practical for providing the basic curriculum direction of the school. Can they not be more appropriately used as individually-accessible resources supporting a curriculum whose main direction is provided by locally-designed, assembled or coordinated materials in relatively low cost flexible formats?

Cooperatively-designed presentations, prevalidated and complemented by low cost, consumable printed materials, can be equally accessible, electronically, throughout an entire system. Concurrently-developed, correlated materials for teachers can be made available through the same system. Such materials would make possible a staff development program and a curriculum that are supportive of each other.

PROBLEM: *Inadequate resources for early childhood education.* Research shows that the learning that takes place during the pre-school years is not only the most vital, but that it determines the learning ability of the student for the rest of his life. Yet, we have found no way to insure that the children who enter our schools at age 5 or 6 have an adequate base of learning upon which we can build.

Again we are confronted with a logistic problem. We do not have a sufficient number of trained professionals available who can work with the very young child, nor do we have sufficient space to house this instruction, nor do we have prepared curriculum materials.

POSSIBLE APPROACH: Traditional logistic approaches will not work here. We cannot transport children to classrooms if we do not have enough classrooms. Can we, however, use electronic communication media to carry this educational process outside of the school walls into homes, community centers, day-care centers and church rooms to the children?

We cannot transport teachers to these children if we do not have enough teachers trained in this specialized field of education. Can we, however, through the use of electronic dissemination, provide the opportunity for the most appropriate curriculum specialists to develop new forms of early childhood learning experience? Along with this new televised curriculum and its related materials, the electronic system could make possible the correlated training and involvement of mothers, siblings or community "volunteers" to serve as paraprofessionals who could supplement, develop and supervise the child's learning activities.

Without building a single additional classroom or hiring large numbers of new teachers, it might be possible to make an effective beginning in developing learning potentials of our very young children.

Conclusions

A. PRESENT CONDITIONS AND POSSIBILITIES

Generally, we do not turn to the use of new tools until problems get serious enough or we otherwise become dissatisfied with our current means. Today, the serious nature and the increasing complexity of most educational problems demand that new, multi-dimensional approaches be developed - - approaches which are possible because of technology.

Crisis always reduces the acceptability of halfway approaches. Those educators today who are closest to our educational crises are the ones calling for the broadest, most comprehensive solutions. "Tinkering and demonstration projects won't help the present predicament of urban public education," comments noted social psychologist, Dr. Kenneth B. Clark, ". . . most innovations and technology applied this way merely serve to *automate dehumanization*."

During the concluding months of the Project, there were already indications that the growing competition between public needs and public resources available to meet those needs was causing public re-assessment of the role of educational television.

While such questioning will most likely increase during the next few years, it could well serve as a positive force in the development of state or local publicly-supported educational communications systems. What this public examination has already brought to the surface is that the educational broadcasters who dreamed of, fought for and created the present electronic facilities have been looking to educators for leadership in using these facilities in instruction. Correspondingly, educators, thinking that instructional television was something strange and apart from regular instruction, looked to the broadcasters for both instructional materials and leadership.

Thus, an accidental vacuum leadership served to keep television apart from the ongoing needs of education. Television was not being used, in most cases, to deal with critical educational problems. At budget time, the continuing operation of television had to be viewed as competitive with other worthwhile educational activities. The designation of financial priorities, therefore, was made in the framework of ETV *or* vocational education; ETV *or* statewide kindergartens, ETV *or* regional service centers.

It becomes obvious, with hindsight, that television was not best promoted as an "innovation" apart from what it carried. Rather than as a "competitor," it should have been viewed as a way of achieving reforms in curriculum and school management. In the near future, increased understanding and leadership in both education and broadcasting should help to re-frame the problem into the more appropriate "ETV *for* vocational education and ETV *for* pre-school education."

Given the present socio-educational conditions and society's inability to deal with them adequately, it could be concluded that electronic communication's most significant potential lies in two areas: one, as a long range means for achieving more nearly equal allocations of available resources; and two, as a facilitating strategy to begin critical programs needed to prevent any further erosion of human resources.

As stated earlier, the usual means for allocating resources equitably are limited to attempts physically to move people to things, or things to people. In areas of sparse population the usual approach is to *consolidate* resources and bus the students to them. In areas of higher population density, the solution being suggested currently is to *decentralize* to assure that the child is subject to an administrative environment that is familiar with his own.

Both of these means to more appropriate allocations of resources - - centralization and decentralization - - are valid. The danger comes, however, when these means begin to be viewed as ends in themselves. It is especially important to recognize this now that the growing availability of electronic communication facilities makes it possible to have the principal advantages of both. Technology offers the advantages of cooperative planning and pooling of resources that consolidation achieves, as well as the local involvement and participation that comes with decentralization.

Until now, public "support" of education has provided a minimum base of teaching with the hope that this would assure at least minimum learning. This has taken the form of either direct state financial aid to local schools or fixing minimum standards for teachers, curricula, or facilities. Whereas a State Department of Education has been limited to these attempts to affect the *inputs* to the learning process, now it is becoming increasingly possible for the Department to play a more direct role in assuring the outputs.

As the number of states with statewide communication interconnection increases there no longer will be any reason for a Department of Education to limit itself to the production of teacher curriculum guides, and the operation of teacher workshops, as attempts, once-removed, to affect learning. The electronic communication resources in these states give them the potential to develop and disseminate direct instructional materials designed to learner-performance objectives upon which a local school and its staff can build.

This "floor" of minimum learning correlated with electronically disseminated, and therefore more frequent and accessible, in-service training experiences can make it possible for a school to build as far above the "floor" as local desires, interest and support permit.

Electronic communication technology also has the potential to make significant beginnings in an area of education where lack of resources and understanding have prevented us from operating pre-school instructional programs.

As half the states in this country struggle to implement the state-wide kindergarten programs which they lack, research is indicating that, when and if provided, education beginning at age five is still not early enough. We realize now that for many children planned learning experiences have to be provided as early as age two. But we are still hampered by what seem to be logistic restrictions: "schooling" cannot start until the child is old enough to be taken to school; new school facilities will have to be built for pre-school education; new highly skilled personnel will have to be found and trained.

As shown in the preceding sections of this report, such logistic problems can be dealt with: we can use electronic communications to facilitate society's first steps in the provision of effective early childhood education experiences on a wide scale. Whether this is the optimum method is not the question. Until additional resources can be made available, a start can be made by extending and reapportioning present resources by means of radio and television. Valid interactive experiences can be brought into homes, day care centers, churches and other non-school buildings. Similarly, correlated experiences can be provided electronically for the training of para-professional staffs to work with the pre-school children. And the knowledge and concern of the professional in early childhood education can be extended through cooperatively planned and developed learning materials.

Pre-school education, in industrial terms, could be considered a *process* correction, whereas remedial education could be viewed as a *product* correction, an attempt to "fix" the output of a system without making any change in the process that created the defective product. In this sense, the child who will enter first grade after three to four years of an effective pre-school experience will be "different" from children without such experience. If an educational system can restructure itself to accommodate and deal with this different child, then as he moves through the grades, the system will be continually responsive to the background and experience of the child.

To manage the programs of massive remediation required in some systems today, concurrent with the development of the more effective systems of education required by the increased learnings of this "different" child would seem to demand resources beyond the present capabilities. While electronic communication technology offers potentials for use in both remedial and pre-school programs separately, it can make a significant contribution to the solution of the logistic problems involved in the systematic design and operation of a combined program.

B. SYSTEMS APPROACHES AND ELECTRONIC COMMUNICATION

We do not just have "more" problems today. The problems have become different in kind. Because they are different in nature, as well as in magnitude, the means for dealing with them must be comparable. The same solutions that "worked" with a smaller problem cannot be merely extended to deal with the broader, more complex, concern. As J. S. Mill has written, "against a very great evil, a small remedy does not produce a small result - - it produces no result at all."

With this in mind, there has come into education in recent years an increasing interest in *systems analysis,* which attempts to identify the elements of a problem and their inter-relations and *systems design* which attempts to state system objectives and to organize resources toward their attainment.

System analysis and design, however, to be useful requires means for providing for *systematic operation,* as well. At this point electronic media can make their principal contribution. Much as the way that highway and hallway systems make possible the limited forms of cooperation seen in education today, so electronic "highways" can provide the means for expanded participation and for the movement of ideas and experiences necessary for a system to behave as an integrated, *interactive* whole.

The use of communication technology and the "systems approach" in education can no longer be viewed as separate processes or concerns. They are interdependent facets of the same approach to the management of a complex educational environment.

This is especially important to understand because the problems we face today are interrelated and to some extent chronic. They cannot be "solved" one-by-one or once and for all. The electronically-facilitated *systematic operation* of an educational institution can make it possible to operate educational systems with new strategies that are both comprehensive and flexible.

Instructional planning, for example, rather than stopping when the curriculum is written down, can continue from the increased feedback, which will permit continuing analysis and modification. Concurrently curriculum development will benefit from electronic and low-cost print dissemination techniques which make it less expensive in time and money to change materials. In a continuous process such as this, instructional design and instructional technology can play their proper roles as part of curriculum development rather than as separately administered, funded and staffed activities. It will be possible therefore for curriculum development to be conceived of as a continuing cooperative process of validation - - moving constantly toward the goal of closing the *gap* between what is taught and what is learned.

In the administrative management of the school, too, planning can be made more flexible. At the present time the major *administrative* decisions regarding the apportionment of time, space, personnel and resources are made on a periodic basis at an administrative level increasingly removed from the classroom environment. They provide tight limits on what little flexibility the teacher may have to make daily decisions responsive to the needs of the individuals in his class. Electronically-facilitated systematic operation providing connections for man and information storage devices can make it possible for planning and decision making to manage resources in response to immediate learning needs.

Society's allocation of resources for education has been limited mainly to the formal educational process during the "school years." Today, however, there are more Americans involved in post-school business, industrial or continuing professional education than are enrolled in our school systems. The need for effective means of upgrading and developing employee skills is a continuous one, and one that affects every private and public agency. Here, too, part of the problem is access and the tendency to view each situation independently. [4/]

To have it otherwise, means to deal with educational problems on a broad scale, and to develop a means of managing educational communications that go beyond formal educational applications. The lack of physical and financial resources alone makes impractical the building of duplicate systems of communication transmission for each public or private agency. The "Each one - Own one" practice of commercial and educational television will not be an adequate administrative, technical or economic base for implementing comprehensive educational efforts.

Educational "stations" could logically be developed into cooperatively supported, community communication resources that can house the staff and technologies for the proper structuring of many kinds of educational communications. They can serve as central "switchboards" to move experiences to appropriate places at appropriate times.

4/ One large industry estimated recently that it cost them the equivalent of eight and a half man-years on the Los Angeles freeways in order to move their employees to continuing training experiences. Similarly, a Municipal Health Department in a large urban area, faced with an increasing number of unreliable bacteriology laboratory reports, could not provide the facilities and resources required to retrain each year any more than 24 of the potential of 6,500 technicians.

C. THE NEXT STEPS

1. *Comprehensive Development*

The ability to view problems, conditions and situations in their totality has been a luxury reserved for philosophers and generalists. The practical man, because he felt little could be done about total problems, preferred to work with the pieces.

Our schools have always been interactive "wholes" with elements and problems that interrelate. Unfortunately, as practical educators we are not accustomed to dealing with the segments of our educational institutions as variable, interrelated elements. To promote efficiency and administration, we have turned *them* into constants that resist change. Time, as expressed in the bell schedule, has become one of these. Space is another. We have always used rectangular classrooms with immovable walls, so our solutions are always perceived within such fixed settings. Teacher load and role become another constant - - a ratio of one teacher, talking, to twenty five to forty children, listening. Our creative thinking has been hampered by what we have assumed are the unchangeable "givens" of the school situation.

This rigidity has forced the learner to become the variable. He is squeezed and shaped to fit the system. If he cannot fit, he learns to conform and tunes out, or resists and drops out.

While it is true that recent innovations have made attempts to penetrate these traditions, each has been seen as a breakthrough at just one point in the environment. Modular scheduling, team teaching, computer-assisted instruction, flexible walls, TV instruction, variable grouping, non-graded programs - - these new attempts at making the elements in the environment more responsive to the learner have in most cases been instituted singularly while the other elements remain static and constant. [5/] But in any complex situation, if only one variable is changed, no significant difference results. This is why the overall improvement in American education, after ten to fifteen years to one-at-a-time "spot" innovations, has been relatively small. As one noted researcher concluded, there was "no significant difference because there was nothing significantly different."

Is comprehensive change possible? If we are to deal with complex problems utilizing comprehensive

5/ The researcher, in fact, has urged that these be kept constant in order to facilitate the collection of data.

approaches, it will be necessary to view the attainment of our complex objectives as the end of a developmental process. Facilitating this developmental process should be our chief concern today.

It will require that the various functions of an educational institution such as curriculum development, administration and staff development be able to interact and relate to one another as they move toward new optimum relations. In its various forms, electronic communication technology can facilitate, extend and make more effective these interactions.

2. *Commitment to Ends Rather Than to Means*

Those who determine school policy cannot evaluate the appropriateness of alternative strategies in their particular school systems until they have determined their objectives. While commitment to a goal expressed in terms of the learner does not assure its attainment, it at least provides a direction in which a school system can move, and a point toward which personnel can measure progress.

The means for moving toward the committed objective must, realistically, take into account all factors and conditions affecting their achievement. Every resource that may have potential value must be considered and assessed. We cannot afford to ignore techniques merely because they do not fit into preconceived ideas or fixed images of what the institution of education should, or should not, be like.

An excellent example of what commitment to objectives can mean was observed in a mid-western elementary school. The principal and staff had recognized that they were not doing enough to meet the individual needs of each student. As in most schools, those who deviated from the norm received the most individual attention. The average child was assumed not to be "different" and therefore could be dealt with in a group. Additionally, the staff recognized that they were not capitalizing on the important resource that each student's own family could provide. For common logistic reasons, parents could not be brought directly into the educational process.

Having committed themselves, however, to these two basic objectives the staff looked about them to see what resources they might better use to attain them.

After assessing all available resources, the staff found that with very little change in the allocation of teacher time during school hours, they were able to make it possible for each teacher, during the evening, to talk, by telephone, to each of his students at least once every two weeks. On the telephone, the teacher and student talked directly with no competition from other classmates. They discussed matters of mutual interest, expressing opinions, making suggestions, interacting as human beings. In addition to this, the teacher, at least once every six weeks, used the telephone to talk personally with the parents. Again, there was no threat involved; it was a discussion between two individuals both caring about the same child.

That this school system was able to get a great deal closer to its basic objectives was a function of its commitment to those objectives, rather than a commitment merely to means. For had they begun, as we so often do, by asking themselves how they could use or make better use of the telephone in education, they would most likely have come up with "tele-lectures," "data-phones," or other techniques that fit into the present concepts of education. They might never have been able to project the unique use of electronic communication that they eventually made.

Einstein said, "Our age is characterized by the perfection of means and the confusion of goals." If one is to make commitments to ends, it is necessary to know which of our goals are within reach today. Unfortunately, our demonstrations of innovative techniques in education in the past have primarily been seen as demonstrations of means, rather than of goals attained. For example, most visitors come to Hagerstown, Maryland, to view the techniques of closed-circuit television rather than to investigate the accomplished goal of disseminating an articulated 12-year curriculum in science, music and art throughout a 400-square-mile, rural county. We have continually talked about what our technologies do rather than what they make it possible for people to do.

3. *The Context of Electronic Communications in Education*

It is natural to judge a tool in terms of the uses to which you have seen it put. Therefore, it is difficult not to equate any use of radio and television with its uses for commercial entertainment. In education, the view of television and other electronic media as interfering devices from outside the sphere of education has tended to reduce the ability of educators to use these tools to advance their own interests and objectives. Even within educational broadcasting itself, there are frequent attempts to measure effectiveness by the yardsticks of commercial entertainment uses, rather than by those of education.

What is required today is an ability to perceive electronic technology as dispassionately as we view the telephone. The problem, therefore, is not whether electronic technology *itself* will be allowed to "do the whole job," but rather, whether electronic technology can make it *possible to do the whole job*.

Through the trade-offs that technology makes possible, we can deal with the environmental problems that today oppress the educator, preventing him from performing in the role for which he has the potential. The teacher who cares about children but, because of lack of time and resources, has to devote his efforts primarily to presenting information can not only be "freed," but can be provided the training and resources that are requisite to proper functioning in this role.

As man continues to develop means to affect people at increasingly greater distances, we not only can, but must, develop means for providing increased access to the images and accomplishments of other men. If the "window" that electronic media provides can enhance man's sensitivity to the universal values that bind him to other men, then they may also serve as "mirrors" to the new understandings of self that are required in an increasingly complex age.

Electronic communication can provide the medium upon which a new era of humanism can grow, if those who currently profess humane purpose but fear technology can readjust their expectations of the possible. "Many a liberal educational reform has foundered on a lack of specific tools for accomplishing its purposes," comments George Leonard in *Education and Ecstasy*. ". . . Far from decrying and opposing an onrushing technology, we must see technology as an ally, a force that can as easily enhance as diminish the human spirit."

UNIT I Large Land and Water Masses

Appendix

A. EDUCATIONAL BROADCASTING INSTITUTES

These received indirect NPITI assistance in the form of staff support.

Raleigh, North Carolina	**3/17-20/68**
Albuquerque, New Mexico	3/30-4/2/68
San Francisco, California	**4/3-6/68**
West Lafayette, Indiana	**4/7-10/68**
College Park, Maryland	**7/8-11/68**

B. SEMINARS AND CONFERENCES

Seminar on Learning and Television - July, 1966
Palo Alto, California

National Conference of Field Consultants - January, 1966

Communication Technology and The People Left Behind -
A Working Conference on Rural Poverty - May, 1968

C. MAJOR PUBLICATIONS AND MATERIALS

The Application of Behavioral Principles to the Production and Use of Televised Instruction (Working Title), by Dr. Lark Daniel

Fundamentals of Television Systems: A Technical Monograph for Non-Technical Personnel, by **W. J. Kessler, P.E.**

Visual Essays:
A New Look At An Old Log;
Cooperation: When There is Here

Design of Programmed Course to Assist ITV Practitioners in Applying Behavioral Principles to the Design of Instructional Broadcasting Materials

D. CONSULTANT VISITS

Alpena School System
Alpena, Michigan
December 1-3, 1965

Eugene School System
Eugene, Oregon
April 11-13, 1966

Prescott School System
Prescott, Arizona
May 23-24, 1966

Rochester City School District
Rochester, New York
May 23-25, 1966

Salesianum High School
Wilmington, Delaware
May 25-26, 1966

Highline School System
Seattle, Washington
June 13-15, 1966

North Star Borough School District
Fairbanks, Alaska
June 13-18, 1966

United States Military Academy
West Point, New York
October 4-7, 1966

North Syracuse Central Schools
Syracuse, New York
November 2-4, 1966

Independent School District No. 274
Hopkins, Minnesota
November 14-16, 1966

Detroit Public School System
Detroit, Michigan
January, 1967

Western Washington State College
Bellingham, Washington
January 9-11, 1967

Simi Valley Unified School District
Simi, California
January 16-17, 1967

Archdiocese of St. Paul
St. Paul, Minnesota
January 16-18, 1967

University of Toledo
Toledo, Ohio
April 11-12, 1967

U.S. Army Signal Center and School
Fort Monmouth, New Jersey
April 23-26, 1967

Nashville School System
Nashville, Tennessee
October 4-6, 1967

Valley Instructional Television Association (VITA)
Sacramento, California
October 24-26, 1967

Lafayette School District
Lafayette, California
February 21, 1968

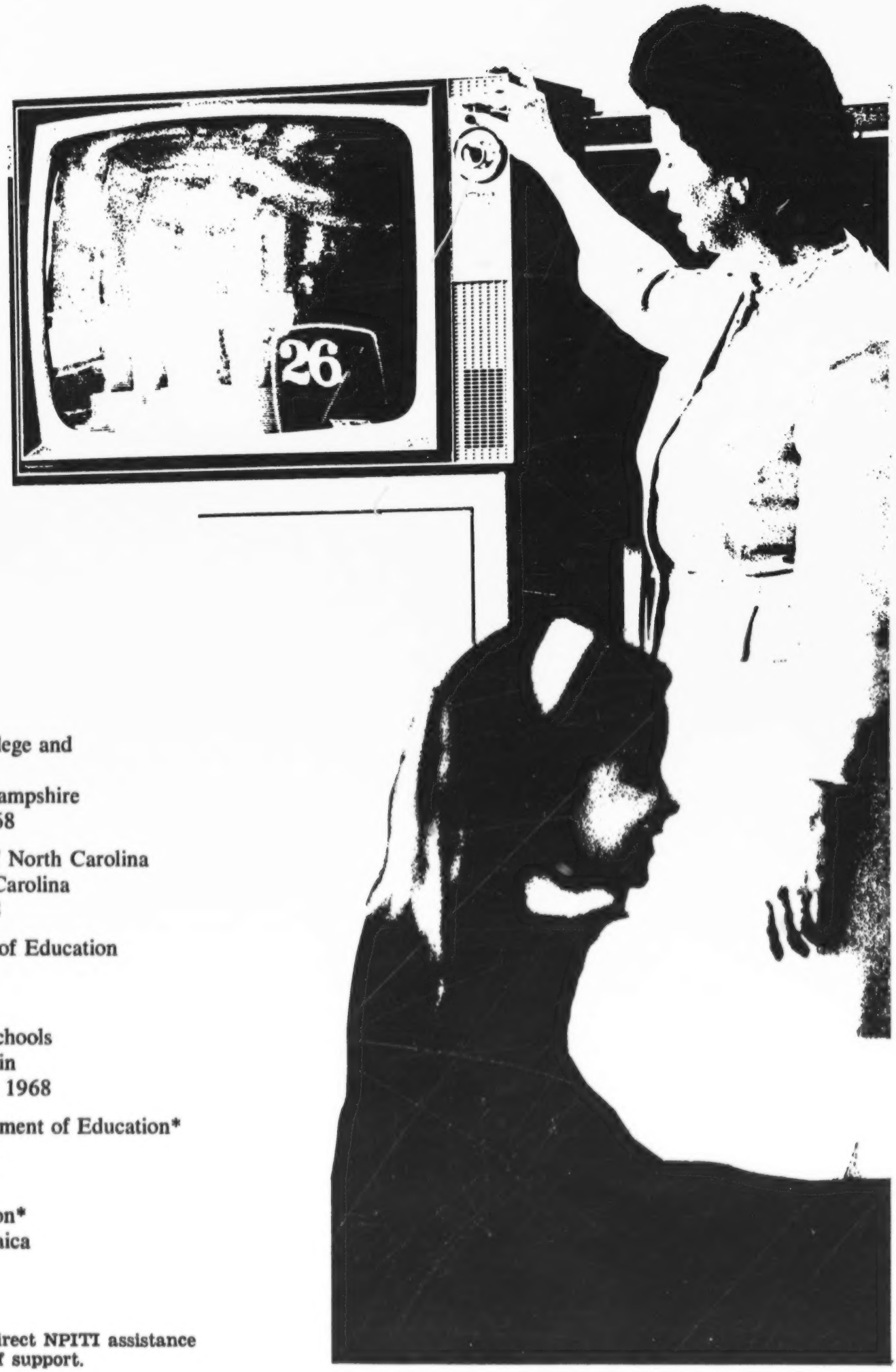
Mohawk-Hudson ETV Council
Schenectady, New York
May, 1968

Colby, Bates and Bowdoin Colleges (WCBB-TV)
Lewiston, Maine
May 19-20, 1967

E. WORKSHOPS

Dade County School System
Miami, Florida
June 22-29, 1967

Racine/Madison School Systems
Racine, Wisconsin
October 30-31, 1967



New Hampshire College and
University Council
Manchester, New Hampshire
February 1-2, 1968

Learning Institute of North Carolina
Wilmington, North Carolina
June 10-13, 1968

Hawaii Department of Education
Honolulu, Hawaii
August, 1968

Milwaukee Public Schools
Milwaukee, Wisconsin
September 16-18, 1968

Florida State Department of Education*
Tallahassee, Florida
September, 1968

Ministry of Education*
Government of Jamaica
Kingston, Jamaica
June, 1968

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* These received indirect NPITI assistance in the form of staff support.